U.S. EPA DETAILED COMMENTS ON THE SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE BAY DELTA CONSERVATION PLAN/CALIFORNIA WATERFIX PROJECT, DATE

Please note that EPA's comments on the BDCP DEIS are incorporated by reference to the extent that they remain applicable.

Alternatives

As presented in the Supplemental Draft Environmental Impact Statement (SDEIS), the Purpose and Need for the WaterFix remains unchanged from that of the Bay Delta Conservation Plan, i.e., to advance the co-equal goals set forth in the Delta Reform Act of 2009 to 1) provide a more reliable water supply for California and to 2) protect, restore, and enhance the Delta ecosystem. As noted in the SDEIS, climate change and upstream diversions are expected to result in a declining freshwater supply to the Delta. To increase water supply resiliency and reliability for the Central Valley Project and State Water Project (CVP/SWP) users, the SDEIS defines the NEPA baseline and the preferred alternative for WaterFix to maintain CVP/SWP exports at 98-108% of their long-term (1952-2014) average volume. In the same baseline and in the preferred alternative, Delta outflow for repelling salinity intrusion and protecting aquatic habitat is set at 20% less than the long-term average. Thus, the full burden of adjusting to the predicted decline in freshwater supply is assigned to water quality and aquatic habitat uses. Critical shortages for ecological water uses are easily observed in the SDEIS analyses, which show substantial decline in quantity and quality of aquatic habitat under the WaterFix, relative to today's already degraded conditions. For the WaterFix to meet its stated purpose and need, and for its benefits to be sustainable, it must establish an operational regime that would not perpetuate or exacerbate the ecological decline of the Bay Delta ecosystem. Increasing freshwater flow through the Delta, and properly timing fluctuations in that flow, are key to such a regime.

The SDEIS does not evaluate an alternative that would substantially improve aquatic habitat conditions for resident and migratory fishes. No alternatives that would provide substantially more water for resident and migratory fishes were evaluated to appropriately bracket the range of CVP/SWP operational scenarios that could occur under the WaterFix. Although two different sizes of tunnels and three different numbers of intakes were evaluated, the SDEIS does not present a reasonable range of operations, despite the fact that Reclamation's action pertains solely to operations. Operational scenarios from the DEIS that would offer ecological benefits, such as BDCP Alternatives 7 and 8, were not carried through to any of the alternatives evaluated in the SDEIS. As was the case in the DEIS, a suite of measures that would optimize operations was only included in the proposed project (in this case, the preferred alternative). Iterative model runs with partner agencies to include those measures and others, such as cold water storage in reservoirs, would have helped to optimize operational scenarios for alternatives other than the proposed project. It appears that operations of the smaller tunnel could be optimized for both water supply and water quality to reduce significant environmental impacts while still meeting the purpose and need for reliability, but this was not done.

> ***Recommendations:***
> Revise the SDEIS to include evaluation of at least one reasonable alternative that would substantially improve aquatic habitat conditions. Carry forward, into the Revised SDEIS, elements of alternatives from the BDCP DEIS that would provide increased Delta outflow and take into consideration Delta hydrodynamics and cold water management for resident and migratory fishes. Circulate the Revised SDEIS for public review and comment. (See *Recommendation* under "Pending Regulatory Actions", below, regarding recommended timing for revision of the SDEIS to support Reclamation's proposed action.)

Develop and include in the Revised SDEIS an operational scenario for the one-intake, one tunnel facility (Alternative 5A) that would optimize water exports in tandem with improvements in Delta outflow, hydrodynamics, and upper watershed conditions that would optimize aquatic life and water quality protection.

Modeling

The descriptions of the proposed project and the federal action, as described in the SDEIS, differ significantly from those described in the DEIS. The SDEIS presents a newly defined No Action Alternative to serve as a baseline, along with three newly defined action alternatives (2D, 4A, and 5A). These action alternatives vary in the size of the tunnels and number of intakes, but have limited operational differences and little to no tidal marsh or floodplain restoration. Consideration of the fifteen BDCP alternatives that were presented in the DEIS has been discontinued, as the California Department of Water Resources (DWR) is no longer seeking approval of a Habitat Conservation Plan (i.e., the BDCP) by the U.S. Fish and Wildlife Service and National Marine Fisheries Service under the Endangered Species Act.[1]

Despite these changes, the SDEIS relies on modeling results that are based on the BDCP alternatives, which were modeled to include 25,000 acres of tidal habitat and 17,000 – 20,000 acres of floodplain restoration, in addition to the proposed tunnels. EPA is very concerned that this may not provide a reasonable estimate of water quality and aquatic life impacts from the newly defined alternatives. Sensitivity analyses, discussed in Appendix B to the SDEIS, were conducted to justify that the original modeling completed for BDCP alternatives can be used to bracket a range of environmental effects that the WaterFix alternatives may produce; however, other information in the SDEIS suggests that the modeling done for the BDCP alternatives is not necessarily representative of the effects to water quality and aquatic habitat that would result from the WaterFix alternatives. For example, DEIS Appendix 5A Section D Attachment 2 shows that the presence of tidal habitat restoration can cause a 14% reduction to a 50% increase in tidally averaged salinity conditions, depending on location; and SDEIS Appendix 8H Attachment 1 shows substantial salinity reductions in Suisun Marsh when tidal restoration projects are not present. Thus, given the aforementioned changes, the SDEIS does not present modeling results for the currently proposed project.

Because the SDEIS contains analyses that show significant changes in water quality and aquatic habitat quality as a result of the presence or absence of habitat restoration, and the sensitivity analysis in Appendix B does not evaluate many water quality and aquatic habitat elements, EPA disagrees with Reclamation's conclusion that the BDCP modeling can be reasonably relied upon to accurately predict the environmental effects of WaterFix alternatives (Section 4, page 4.1-43). Furthermore, the magnitude and range of changes in salinity shown in these analyses could also apply to other water quality and aquatic habitat quality indicators, such as electrical conductivity, chloride, sediment, bromide, selenium, mercury, and *microcystis,* because they, too, are a function of hydrodynamic changes that can be substantially altered by the presence or absence of tidal habitat and floodplain restoration. These water quality indicators are a measure of water quality for human consumption as well as for aquatic ecosystem habitat.

[1] It is unclear from the SDEIS whether or not the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service may yet consider approving a Habitat Conservation Plan (HCP) for any activities associated with the proposed project. Neither the BDCP DEIS nor the WaterFix SDEIS is adequate to support a federal action on an HCP because outstanding environmental and analytical issues identified by EPA, federal and state partner agencies, and science panels regarding the BDCP alternatives have not been resolved. If BDCP or other HCP alternatives are to be pursued in the future, further NEPA analysis would be required to support federal approval decisions.

Recommendation:
Update the modeling, using current definitions and the most recent model versions to represent the WaterFix alternatives, and disclose the results in the Revised SDEIS. Include, in the Revised SDEIS, any new aquatic life analyses that are being conducted to support federal decisions under Section 7 of the Endangered Species Act. Adjust impact conclusions accordingly.

Pending Regulatory Actions

Regulatory actions by several federal and state agencies are likely to modify the WaterFix project enough that the estimated environmental effects will differ from those disclosed in the SDEIS. First, the State Water Resources Control Board (SWRCB) will need to act on a request to change the point of diversion in the water right permit held by DWR and Reclamation to operate CVP and SWP. This State regulatory action could include terms and conditions, including flow requirements, that modify WaterFix operations sufficient to produce environmental and water supply effects that have not been captured by the SDEIS. Appendix C to the SDEIS provides, in limited detail, an example of the potential changes to water exports and environmental freshwater flows that may be considered by the SWRCB. In addition, the SWRCB is in the process of updating water quality standards intended to protect aquatic life in the San Francisco Bay Delta estuary. These standards could increase freshwater flows for environmental uses, limit water supply diversions and exports, and be in effect by the time the WaterFix project begins to operate.[2] The SWRCB will also be required to issue a Clean Water Act (CWA) Section 401 water quality certification, which may include conditions.

Second, ESA Section 7 Incidental Take Permits issued by the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) will be required for construction and operation of new conveyance facilities. We understand that the Section 7 permit process is generating additional information that is needed to identify criteria for operating the new WaterFix facilities to avoid jeopardizing the continued existence of threatened and/or endangered species. The operational criteria and analyses to support them developed through the ESA process are not included in the SDEIS and could result in changes to estimates of water supply and environmental effects that are not captured in the range of estimated impacts disclosed in that document.

Finally, one or more CWA Section 404 permits for dredged or fill material, and Rivers and Harbors Act (RHA) Section 408 authorization for modification of levees, will be needed from the Corps of Engineers for construction to begin on the WaterFix project.

Recommendation:
Revise the Supplemental Draft EIS once the State Board actions have been completed and the FWS and NMFS have issued their Biological Opinions, and include sufficient information in the Revised SDEIS to support a CWA Section 404 permit decision by the Corps.

Fish and Aquatic Habitat

Much work remains to address the need for ecosystem restoration. The aquatic resources of the Bay Delta ecosystem are severely stressed and in significant decline. EPA recently completed an evaluation of the causes of this decline in its Advance Notice of Proposed Rulemaking.[3] The ANPRM concluded the following:

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[2] State Water Resources Control Board (2010) Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem Flows Report, p.7. "Both flow improvements and habitat restoration are essential to protecting public trust resources" [defined as "native and valued resident and migratory species habitats and ecosystem processes" p. 10].

[3] http://www2.epa.gov/sites/production/files/documents/baydeltaanpr-fr_unabridged.pdf

"Current research findings do not support the idea that a 'single stressor' is responsible for the ecological changes in the Bay Delta Estuary. Most research supports the idea of multiple stressors, interacting in concert, as the cause of the Bay Delta Estuary ecosystem decline" (p. 10).

Those stressors include, but are not limited to, the loss of aquatic and terrestrial habitat, water project operations, the spread of invasive species, changing ocean conditions, and contaminants. We are pleased to see predicted aquatic life benefits, such as substantial reductions in entrainment and negative flows in Old and Middle Rivers, for most species evaluated under the Preferred Alternative. These are important improvements and genuine benefits to aquatic life that could result from the WaterFix project. However, we are concerned that these benefits would not overcome the predicted negative impacts to aquatic life that would result from continuing to export a significant proportion of freshwater inflows -- 33%, based on historic average inflows (1952-2009; not including north of Delta diversions) -- out of the estuary. The Preferred Alternative proposes to maintain exports at current or slightly higher volumes, which would perpetuate the Delta outflow conditions that have contributed to sharply declining resident and migratory fish populations over the last fifteen years.

The SDEIS predicts that the quantity and quality of aquatic habitat for many fishes in the Delta ecosystem and upstream tributaries will be substantially reduced by the combined effects of the WaterFix project, climate change, and water diversions from the Sacramento River north of the Delta.[4] The document attributes the decline primarily to climate change and the upstream diversions, yet the data presented show that the isolated effect of the WaterFix project may reduce habitat conditions for delta smelt, winter-run Chinook salmon, green & white sturgeon, striped bass, and American shad, and result in a decline of longfin smelt abundance. For example, the analysis shows that winter-run Chinook salmon and sturgeon may be negatively impacted when migrating past new intakes and the resulting reduction in flows immediately downstream.

Operational criteria for the new intakes are being developed through ESA Section 7 consultations to protect threatened and endangered fishes, but these analyses are not yet available. NMFS and FWS concluded in 2008 and 2009, respectively, that continued operation of SWP and CVP would result in jeopardizing the continued existence of delta smelt, winter-run chinook salmon, green sturgeon and several other fishes, and the SDEIS predicts that aquatic habitat for most of these fishes will decline with implementation of the WaterFix. These fish species have experienced sharp population declines in the last decade and continue to show record low abundance over the last five years. The potential for additional declines in aquatic habitat conditions and for maintenance of insufficient flow conditions as a result of the continued operations of the CVP/SWP as modified by the WaterFix suggests that the project could further reduce habitat conditions beyond those that led to jeopardy determinations in the CVP/SWP biological opinions from NMFS and USFWS. Contributing to substantial negative effects on special status species and aquatic habitat is inconsistent with achievement of aquatic life beneficial use protection required by water quality standards under the CWA.

Recommendations:

Modify operational scenarios for the Preferred Alternative to develop at least one alternative that would have more certain and beneficial effects on migratory and resident fish populations during all life stages.

Present the predicted impacts to each of the fish species and impact categories (entrainment,

[4] See the following AQUA impact categories: 3, 21, 40, 42, 58-59, 76-79, 96-98, 130-132, 148, 150, 167, 185, 201, and 203 in the SDEIS analysis of alternative 4A.

spawning, rearing, migration), for all the alternatives and baselines in comparative form, sharply defining the issues and providing a clear basis for choice among options by the decision-makers and the public (40 CFR 1502.14).

Provide absolute value estimates (when available) and proportional changes, in addition to relative changes from baselines, for predictions under each Alternative.

Describe the scientific basis of, and uncertainty associated with, any assumptions made in the analysis, including in the development of the No Action Alternative. This may include, for example, data regarding current entrainment levels of each fish species at each life stage in each water year types.

Use a consistent approach that recognizes the demonstrated significant correlations between freshwater flow and fish species abundance to analyze all of the Alternatives. Describe the analytical approach and provide the rationale for, and implications of, any deviations from it.

WaterFix impacts to aquatic life and water quality estimated in the SDEIS are inconsistent with federal policy goals and California state law. In 2009, six federal agencies, including EPA and Reclamation, signed the Interim Federal Action Plan (IFAP)[5] and agreed to work together on programs and projects "to ensure healthy Bay Delta ecosystems and improve water quality". The thresholds set by Reclamation in the SDEIS to determine whether or not the effects of WaterFix are detrimental to the environment are substantially less rigorous that what we collectively envisioned when we signed the IFAP in a mission to improve the health of the Bay Delta ecosystem. Specifically, the SDEIS concludes that impacts are "non-adverse" even though they contribute to continued degradation of aquatic habitat (salinity, flow, and temperature), aquatic life (abundance), and water quality (e.g, salinity) because the forecasted impacts are compared to a baseline that predicts continued, significant decline of the Bay Delta ecosystem. For example, substantial *decreases* in longfin smelt abundance relative to current conditions are presented in the SDEIS as *increases* relative to the "no action alternative" because the expected decreases are less severe than those predicted by the "no action alternative" baseline. Such characterization of impacts may suggest to some readers that the proposed project would result in maintenance or improvement of current water quality and aquatic habitat conditions, but this is not accurate. We encourage Reclamation and all federal and State agencies with responsibilities affecting the Bay Delta to make full use of their respective authorities and tools to bring about actual improvements in the water quality and aquatic habitat conditions across the ecosystem.

Recommendations:

Clearly establish the difference between the threshold for NEPA effects determinations and federal and state goals for the estuary.

Clarify, for outcomes identified as improvements relative to the NEPA baseline, that such outcomes represent, in many cases, smaller environmental losses or declines relative to the existing conditions baseline than would otherwise be expected, but do not necessarily represent improvement over current conditions.

Water Quality

[5] http://www2.epa.gov/sites/production/files/documents/interim_fed_action_plan.pdf

Water quality analyses show that the Preferred Alternative may cause or contribute to increasing salinity concentrations and violations of salinity criteria that protect aquatic life, agricultural, and municipal beneficial uses in the project area. Modeling results show the western Delta and Suisun Marsh becoming more saline over time. For example, the SDEIS estimates a 7-22% increase in the number of days exceeding salinity criteria that protect agricultural and aquatic life beneficial uses at the Prisoners Point and Emmaton compliance locations (Appendix B, Table EC-1 p. B-129). Similarly, modeling results show that salinity assimilative capacity is reduced at monitoring locations near municipal water supply intakes as salinity reaches and exceeds EPA recommended drinking water criteria for chloride[6] (Appendix B Tables Cl-18, p. B-123 and CL-21 p. B-125).

The SDEIS indicates that the proposed project may cause or contribute to significantly adverse impacts to municipal and industrial water supply, fish, and the aquatic ecosystem. The water quality analysis shows that the preferred alternative has the potential to cause or contribute to significantly adverse effects to municipal and industrial beneficial uses in the western Delta by reducing chloride assimilative capacity. The SDEIS predicts that the isolated effect of Alternative 4A will reduce assimilative capacity for chloride in the western Delta (Antioch, Contra Costa Pumping Plant #1). Tables Cl-12 and Cl-14 in Appendix B of the SDEIS show reductions in assimilative capacity that range from 2-88% in April to October of drought and non-drought years, depending on location. Reduced assimilative capacity in wet season months is especially important for western Delta communities because they provide the best opportunity to divert fresh/non-saline water for municipal & industrial uses. It appears that the high levels of CVP/SWP water exports proposed in the WaterFix project would contribute to operational conditions in the future that would make it more difficult to provide water of the quality necessary to support agricultural and municipal uses in the western Delta and aquatic life beneficial uses throughout the Delta.

Mitigation actions identified in the SDEIS may eliminate actual exceedances, and the compliance history shows that salinity standards are rarely violated. However, modeling assumptions and errors, combined with the redefinition of the project and baselines without updated model results to match the new definitions, may result in errors predicting salinity. These changes make it difficult to determine the frequency, magnitude, and duration of exceedances and the subsequent effect on beneficial uses. If modeling shows salinity generally increasing in the Delta after consideration of all the modeling issues, this indicates that there will be less operational flexibility to meet water quality criteria as a direct result of project operations, and little room for error in operating the system in the future. As a result, we are concerned that the proposed project would make future compliance with water quality standards more difficult, which would increase the chances of exceeding water quality standards and failing to protect multiple beneficial uses.

> ***Recommendation*:**
> Update the water quality analysis with the most recent version of CALSIM and definitions of project baselines and project description.

The water quality analysis also shows that WaterFix operations may result in significant adverse impacts to fish from selenium impacts. The SDEIS states that estimated selenium concentrations in sturgeon are predicted to increase by 12-19% as a result of the Preferred Alternative. The estimated selenium level in tissue (Tables Se-5 and Se-6 in Appendix B) exceeds the USFWS & NMFS concern threshold of 4 mg/kg dry weight for adverse impacts to warm water fish[7]. The "non-adverse" effect determination does

[6]EPA webpage: Secondary Drinking Water Regulations: Guidance for Nuisance Chemicals; the drinking water criteria for chloride is set at 250 mg/L. http://water.epa.gov/drink/contaminants/secondarystandards.cfm

[7] San Francisco Estuary Institute (2006) Grasslands Bypass Project Report 2004-2005. Chapter 7 Biological Effects of the Grasslands Bypass Project.

not appear to be supported by data presented in the SDEIS.

WaterFix is being proposed, in part, to secure irrigation water supply for agricultural lands that discharge irrigation return water with high concentrations of selenium. A pending prohibition to discharge will take effect in 2019 if selenium loads from some of these lands are not sufficiently reduced to protect aquatic life and meet selenium standards in the San Joaquin River.[8]

***Recommendations*:**
Identify methods for balancing water quality and aquatic life protection that minimize conflicts, such as closing Head of Old River Barrier to protect salmon migration and water quality to limit fish exposure to selenium.

Take measures to either reduce the selenium load coming in from agricultural lands that discharge to the San Joaquin River through source control, such as meeting or exceeding the selenium load reductions outlined in Appendix C of the 2009 Agreement for the Continued Use of the San Luis Drain, and/or reducing Delta residence time to minimize aquatic life exposure to selenium in the Delta.

Impacts of Changes to the Salinity Gradient (X2)
The salinity gradient, approximated by X2[9], has an inverse relationship with many diverse bay and estuarine fishes, including the threatened and endangered species that have been evaluated in the document. As X2 decreases (i.e., moves out to sea), relative abundance of some species increases.[10] Because the location of X2 is closely tied to freshwater flow through the Delta, the proposed project would have a strong influence on this parameter, yet the SDEIS does not analyze the Preferred Alternative's impacts on aquatic life in the context of this relationship.

Examination of the predicted changes in monthly average X2 would help determine how the quantity and quality of estuarine habitats and relative fish abundance would change under those scenarios for multiple fish species. It would also be useful to estimate the range of monthly average X2 values (and/or monthly Delta outflow) for each alternative and compare it to the pattern of freshwater flows and salinity gradients that characterized a reference time period when resident and migratory fish populations were in comparatively better condition. Freshwater flow may be one of the best tools available in the short term to improve estuarine habitat conditions, fish populations, and protect aquatic life beneficial uses prior to the completion of planned restoration projects, given its widely cited importance to ecosystem recovery.

Recommendation:
Include a year-round salinity gradient and/or Delta outflow analysis for the Preferred

Authors William N. Beckon, Ph.D., U.S. Fish and Wildlife Service; Michael C. S. Eacock, U.S. Bureau of Reclamation; and Andrew G. Gordus, Ph.D., California Department of Fish & Game; Lemly, A.D. 1996. Selenium in aquatic systems. In: W.N. Beyer, G.H. Heinz and A.W. Redmon-Norwood, eds., Environmental contaminants in Wildlife: Interpreting tissues concentrations. CRC Press, Lewis Publishers, Boca Raton, Florida. p. 427-445

[8] California Central Valley Water Board (2010) Resolution R5-2010-0046 Amendment to the Water Quality Control Plan for the Sacramento and San Joaquin River Basins for the control of Selenium in the Lower San Joaquin River Basin, Attachment A, p. 1

[9] X2 refers to the distance from the Golden Gate up the axis of the estuary to the point where daily average salinity is 2 parts per thousand at 1 meter off the bottom (Jassby et. al. 1995).

[10] Jassby AD, Kimmerer WJ, Monismith SG, Armor C, Cloern JE, Powell TM, Schubel JR, Vendlinski TJ. 1995. Isohaline position as a habitat indicator for estuarine applications. Ecological Applications 5(1): 272-289;
Kimmerer, W. J. 2002. Effects of freshwater flow on abundance of estuarine organisms: Physical effects or trophic linkages? Marine Ecology Progress Series 243:39-55;
Kimmerer WJ, Gross ES, MacWilliams ML. 2009. Is the response of estuarine nekton to freshwater flow in the San Francisco Estuary explained by variation in habitat volume? Estuaries and Coasts 32: 375-389.

Alternative. Use three-dimensional modeling that maps the salinity gradient within the estuary on a monthly time step for all CM1 alternatives. This would make it possible to estimate the size and location of the low salinity zone under different operational scenarios.

Climate Change and Cumulative Impacts

The SDEIS includes a quantitative evaluation of potential climate change impacts on developed water supply and other built and natural resources. Changes predicted to occur as a result of warming include precipitation and runoff coming earlier in the year, more precipitation arriving as rain and less arriving as snow, snow melt occurring earlier in the year, and losing water storage in snowpack as the Sierra Nevada Mountains warm over time.

The DEIS climate change and water quality analyses are based, in part, on using a three-dimensional hydrodynamic model to evaluate the magnitude of salinity intrusion under several sea level rise scenarios assuming historic CVP/SWP operations and inflows (DEIS Appendix 5A Part D). The 3-D analysis is important because it is an advanced quantitative tool and the 3-D model results were used as a reference condition to re-calibrate the 1-D and 2-D water supply and water quality models used to estimate impacts of the BDCP and WaterFix alternatives. However, the 3-D model assumes a "hard shoreline" which means that the current shoreline is assumed to stay constant with sea level rise, instead of allowing low-lying areas to flood as is expected with sea level rise. The hard shoreline assumption may be valid for low estimates of sea level rise but it will introduce error to water supply and water quality model results at sea level rise estimates greater than 12 inches. Removing the hard shoreline assumption would improve the precision of water supply and water quality estimates. In addition, the results could be used to improve the surface water analysis (DEIS Chapter 6) by identifying areas at high risk of temporary or permanent inundation with varying levels of sea level rise.

Recommendation:

Provide more information about the limitations of the hardened shoreline assumption in the Early Long Term, and the effects of this assumption on water quality and water supply analyses in the SDEIS.

Re-run the 3-D model without the hardened shoreline assumption at the early and late long term time horizons prior to any additional modeling for the WaterFix project so that the 1-D and 2-D models can be re-calibrated using more precise estimates.

Least Environmentally Damaging Practicable Alternative

The WaterFix project will require substantial discharges of dredged or fill material into waters of the United States (waters), including wetlands (waters). Guidelines published pursuant to Clean Water Act Section 404(b)(1) require an alternatives analysis that clearly demonstrates that the proposed discharges represent the Least Environmentally Damaging Practicable Alternative (LEDPA) that achieves the overall project purpose. An alternatives analysis includes estimates of direct, secondary, and cumulative impacts to jurisdictional waters from each alternative considered. Although the range of alternatives considered in a NEPA document can be broader than those analyzed under Section 404, it is advisable that the NEPA analysis include all practicable alternatives that are less damaging to the aquatic ecosystem when the project in question will require Section 404 authorization in order for the public to provide meaningful comments.

***Recommendations*:**

Analyze Alternatives that have fewer direct and secondary impacts to waters of the U.S. than the

Preferred Alternative, with specific reference to the restrictions on discharges at 40 CFR 230.10.

The SDEIS only describes construction avoidance and minimization measures. However, impacts from the tunnel alignment, tunnel size, reusable tunnel material (RTM) locations, intake structures, and operations must be avoided and minimized to maximum extent practicable.

***Recommendation*:**
Demonstrate that each alternative represents the most impact avoidance and minimization that is practicable under that scenario, considering the impacts of all structures, their size and locations, and their operations.

Secondary effects from the Preferred Alternative, including the diversion of freshwater from Sacramento-San Joaquin Delta and the estuarine ecosystem as a whole, are substantial for aquatic life and must be included in LEDPA identification. Secondary effects include, but are not limited to: (1) changes in the salinity gradient and the location and volume of the low salinity zone in all seasons; (2) adverse effects on water quality effects including the amplification of water quality impairments; (3) disruption of migratory corridors for salmonids and sturgeon; (4) decreases in the reproduction and survival of fishes; (5) degradation of aquatic life beneficial uses; (6) disruption and loss of ecosystem processes; (7) reductions in cold water supply for migratory fishes in the upper watershed; and (8) changes to wetland or river hydrology.

Cumulative impacts include past, present and reasonably foreseeable direct and secondary impacts to the aquatic environment. Historical impacts from multiple stressors on aquatic ecosystems include: (1) decades-long declines in native and migratory fish populations; (2) the mortality of native and migratory fish from operating the south Delta pumps; (3) loss of natural cold water inputs caused by historic destruction of wetlands[11], depletion of groundwater aquifers, and the current and future loss of snow pack from climate change; and (4) modified and reduced phytoplankton and zooplankton community composition and abundance.

Cumulative impacts analyses include estimating impacts from foreseeable projects such as the Delta Wetlands Project, the River Islands project, and potential new storage projects (dams, reservoirs, groundwater storage).

***Recommendation*:**
Incorporate direct, secondary, and cumulative effects in the alternatives analysis for LEDPA identification.

Mitigation
If all practicable alternatives, including the LEDPA, would result in significant degradation and/or standards violations, compensatory mitigation actions could lower those impacts to a level that overcomes those violations and allows the project to be permitted under the Guidelines. Given the substantial risks described above, the compensatory mitigation plan thus becomes all the more vital to the success of the project. The SDEIS is not clear regarding the approach to compensatory mitigation for impacts to waters of the U.S. Based on the information currently available, the SDEIS does not present enough information to support a CWA section 404 permit (40 CFR 230.12).

Any compensatory mitigation plan should use a watershed approach such that individual sites are

[11] Dahl, T.E. 1990. Wetland losses in the United States 1780's to 1980's. U.S. Fish and Wildlife Service, Washington, D.C.

chosen and designed to complement each other and provide cumulative benefits to the Delta. The ultimate goal of a watershed approach is to maintain and improve the quality and quantity of aquatic resources within watersheds through strategic selection of compensatory mitigation sites (40 CFR 230.93(c)). This goal is complementary to this project's critical need to offset regional adverse outcomes to water quality and aquatic ecosystem services and comply with the Guidelines. It will not be adequate for this plan to compensate merely for lost acreage of waters of the U.S.

A watershed approach accounts for the interplay among a variety of factors, including ecosystem processes (aquatic and terrestrial), landscape position and historical ecology, habitat loss and restoration potential, habitat fragmentation and cumulative impacts, adjacent land-uses and future risks, and the needs of sensitive species. The Northeast Delta Landscape Restoration Framework provides substantial context and groundwork to inform the compensatory mitigation plan and help the project comply with all of the restrictions on discharges under the Guidelines. The mitigation plan will need to include sufficient information on the overall mitigation framework for the Corps and EPA to evaluate compliance with the Mitigation Rule. Toward this end, the plan should include, at a minimum, the following information:

- A description of watershed needs and mitigation priorities;
- Mitigation goals and objectives;
- A strategy for selecting mitigation sites;
- Methods and process for assessing site specific functions or condition, including the use of standard assessment methods (e.g. CRAM);
- A process for determining credits;
- A monitoring strategy (*see comments below*);
- Long-term commitments for financial assurances and site protection;
- An adaptive management strategy; and
- An outline for any site specific mitigation plans that will be provided at a later date.

***Recommendations*:**
Commit to using the Northeast Delta Landscape Restoration Framework and available historical ecology studies to inform the design, implementation, and monitoring of compensatory mitigation.

Include a final conceptual mitigation plan that includes the information listed above as an appendix.

Finally, the document is not clear whether mitigation will be implemented for the entire project up front or in phases. The 2008 Mitigation Rule states that a permittee must prepare a final mitigation plan and the Corps must approve such a plan (for a project of this scale and scope) which addresses the monitoring and adaptive management requirements as described in 40 CFR 230.94(c)(10-12). Appendix E of the SDEIS states that DWR will seek preliminary concurrence on the final mitigation plan and will "submit to USACE a final compensatory mitigation plan that describes the approach by which unavoidable impacts on waters of the United States related to the entire water conveyance project will be addressed." However, it is unclear what information will be included in this "final" plan submitted and whether additional site specific mitigation plans will be provided at a later date.

***Recommendations*:**
Commit to implementing mitigation in advance of, or concurrent with, project impacts.

Clearly state that compensatory mitigation will be provided for temporary impacts lasting longer than one year.

State what information will be included in the mitigation plan and what information will be provided later in site specific mitigation plans.

Monitoring

The CWA Section 404 mitigation plan must also propose a comprehensive monitoring program that integrates and coordinates water quality and ecosystem performance standards and objectives, methods of their assessment, and reporting. Per the Mitigation Rule, an acceptable mitigation plan must include measureable, enforceable ecological performance standards and a monitoring program informed by the best available science to ensure that the mitigation project is developing as planned and progressing satisfactorily towards meeting those standards (40 CFR 230.95 and 230.96). The WaterFix is a project of such significance, with a reliance on, and need for, extensive monitoring and technical information, that its development represents an opportunity to advance aquatic resource monitoring to benefit the ecological sustainability of the Delta and improve management precision. As highlighted in numerous recent federal and state efforts (e.g., Delta Science Plan, Delta Regional Monitoring Program, Interagency Ecological Program Business Practices Review), it is imperative that large compensatory mitigation programs integrate and coordinate their water quality and related ecosystem monitoring, assessment, and reporting. To that end, EPA recommends the following:

Recommendations:

Commit to developing a fully integrated, comprehensive monitoring framework for the WaterFix. Work with state and federal partners to identify biological, chemical, and physical monitoring requirements necessary for ESA; CESA; CWA 404, 401 and 303; and Porter-Cologne Act compliance.

Ensure that the comprehensive monitoring framework provides the best available information on the extent of impacts from permitted activities, links impacts to mitigation and monitoring actions, and identifies ecological performance standards and methods for measuring and reporting progress.

The comprehensive monitoring framework should include upgrades to the existing water quality and biological monitoring network such as technological advances that reduce monitoring costs and improve biological and chemical modeling capability, temperature monitoring in the upper watershed, and monitoring of the salinity gradient at the water surface and on the bottom of the estuary.

Identify special studies and science needs for informing mitigation actions and monitoring strategies.

Utilize common databases and standard mapping and aquatic resources classification systems to facilitate the sharing of monitoring information across ecoregions and among local, regional, state and federal programs.

Discuss the monitoring framework in sufficient detail to be incorporated into the required CWA Section 404 permit.

Dredged and Reusable Tunnel Material

Appendix A-3B details dredged material (DM) and RTM disposal and reuse commitments, among other environmental commitments. DWR and Reclamation should commit to meeting the Delta Long Term Management Strategy[12] (LTMS) goal to maximize beneficial reuse of DM and RTM.

Recommendations:

Set specific beneficial reuse goals for DM and RTM that are consistent with the Delta LTMS, and commit to placing material in accessible sites to promote beneficial reuse of material.

Discuss how placement of DM and RTM on peat soils will affect subsidence and levee stability.

[12] Delta LTMS is an official Regional Dredging Team established to implement the National Dredging Policy: http://water.epa.gov/type/oceb/oceandumping/dredgedmaterial/aboutactionagenda.cfm